Congressional Research Service
Informing the legislative debate since 1914

Pacific Salmon and Steelhead Trout: Managing Under the Endangered Species Act

Updated November 30, 2012

Congressional Research Service
https://crsreports.congress.gov
98-666

CRS REPORT
Prepared for Members and
Committees of Congress

Summary

Along the Pacific Coast, 28 distinct population segments of Pacific salmon and steelhead trout are listed as either endangered or threatened under the Endangered Species Act (ESA), with three additional populations identified as "species of concern." While no *species* of anadromous trout or salmon is in danger of near-term extinction, individual population segments within these species have declined substantially or have even been extirpated. The American Fisheries Society considers at least 214 Pacific Coast anadromous fish populations to be "at risk," while at least 106 other historically abundant populations have already become extinct.

Human activities—logging, grazing, mining, agriculture, urban development, and consumptive water use—can degrade aquatic habitat. Silt can cover streambed gravel, smothering fish eggs. Poorly constructed roads often increase siltation in streams where adult salmon spawn and young salmon rear. Removal of streamside trees and shade frequently leads to higher water temperatures. Grazing cattle remove streamside vegetation and exacerbate streambank erosion. Urbanization typically brings stream channelization and filled wetlands, altering food supplies and nursery habitat. Habitat alterations can lead to increased salmonid predation by marine mammals, birds, and other fish. Dams for hydropower, flood control, and irrigation substantially alter aquatic habitat and can have significant impacts on anadromous fish. In addition, natural phenomena stress fish populations and contribute to their variable abundance.

Current management efforts aim to restore the abundance of ESA-listed native northeast Pacific salmonids to historic, sustainable population levels. The National Marine Fisheries Service (NMFS, also popularly referred to as "NOAA Fisheries") in the Department of Commerce implements the ESA for anadromous salmonids. When a federal activity may harm an ESA-listed salmonid, the ESA requires the federal agency to consult with NMFS to determine whether the activity is likely to jeopardize the survival and recovery of the species or adversely modify its critical habitat.

Prior to the listing of salmonid "evolutionarily significant units" (ESUs) under the ESA, the Northwest Power and Conservation Council took the lead in the Columbia River Basin under the 1980 Pacific Northwest Electric Power Planning and Conservation Act, by attempting to protect salmon and their habitat while also providing inexpensive electric power to the region. Under this effort, federal agencies and public utilities have spent hundreds of millions of dollars on technical improvements for dams, habitat enhancement, and water purchases to improve salmon survival. Recent years have seen an increased interest by state governments and tribal councils in developing comprehensive salmon management efforts.

This report summarizes the reasons for ESA listings and outlines efforts to protect ESA-listed species.

Contents

Tables

Contacts

Background

Pacific Chinook, coho, chum, sockeye, and pink salmon as well as steelhead trout are anadromous (i.e., they live as juveniles in fresh water, migrate to the ocean to develop, and, when sexually mature, return to freshwater to spawn). While steelhead trout and Atlantic salmon can return to the sea after spawning (and may spawn again in subsequent years), Pacific salmon die after spawning once. Juvenile salmon typically reside in fresh water from a few days (pink salmon) to three years (some sockeye salmon) before migrating to the ocean, where they typically spend one to six years before migrating to their natal stream, as much as 900 miles or more inland. Natural phenomena—predators, droughts, floods, and fluctuating oceanic conditions—stress salmonids and contribute to the variable abundance of their populations. *El Niño*, Pacific decadal oscillation,[1] and global climate change[2] have been of particular concern as factors altering salmon habitat and affecting salmon distribution and abundance.

Precipitous salmon declines in the 1990s hurt the economies of fishing-dependent communities throughout the Northwest and northern California. By the late 1990s, west coast salmon abundance had declined to only a small fraction of what it had been in the mid-1800s, with much of the current population supported by artificial hatchery production.[3] As recently as 1988, sport and commercial salmon fishing in that region generated more than $1.25 billion for the regional economy. Since then, salmon fishing closures have contributed to the loss of nearly 80% of this region's job base, with a total salmon industry loss over 30 years of approximately 72,000 family wage jobs.[4]

Currently, 28 distinct population segments of five salmonid species have been listed as either endangered or threatened under the Endangered Species Act (ESA, see **Table 1**), with three additional populations identified as "species of concern."[5] While no *species* of anadromous trout or salmon is in danger of near-term extinction, individual distinct population segments (designated as "evolutionarily significant units" or ESUs)[6] within these species have declined substantially or have even been extirpated. The American Fisheries Society considers at least 214 Pacific Coast anadromous fish populations to be "at risk," while at least 106 other historically abundant populations have already become extinct.[7] More recently, another study estimated that

[1] N. J. Mantua et al., "A Pacific interdecadal climate oscillation with impacts on salmon production," *Bulletin of the American Meteorological Society*, v. 78 (1997): 1069-1079.

[2] See http://www.usgcrp.gov/usgcrp/Library/nationalassessment/10NW.pdf.

[3] See, for example, National Marine Fisheries Service, *Factors Contributing to the Decline of Chinook Salmon: An Addendum to the 1996 West Coast Steelhead Factors For Decline Report*, (Portland, OR: June 1998), 71 p.

[4] Pacific Rivers Council, *The Economic Imperative of Protecting Riverine Habitat in the Pacific Northwest*, Eugene, OR: January 1992; and "Statement of Glen Spain of the Pacific Coast Federation of Fishermen's Associations," in U.S. Senate, Committee on Environment and Public Works, Subcommittee on Drinking Water, Fisheries, and Wildlife, *Endangered Species Act Reauthorization*, hearing, June 1, 1995, pp. 123-142.

[5] "Species of concern" are those about which the National Marine Fisheries Service (NMFS) has concerns regarding status and threats, but insufficient information is available to indicate a need to list the species under the ESA.

[6] NMFS uses the term "ESU" as synonymous to a distinct population segment that appears to be reproductively isolated from other segments (56 *Fed. Reg.* 58612, Nov. 20, 1991).

[7] Willa Nehlsen, Jack Williams, and James Lichatowich, "Pacific Salmon at the Crossroads: Stocks at Risk from California, Oregon, Idaho, and Washington," *Fisheries*, v. 16 (1991), pp. 4-21; and T. L. Slaney et al. "Status of Anadromous Salmon and Trout in British Columbia and Yukon," *Fisheries*, v. 21 (October 1996), pp. 20-35.

29% of nearly 1,400 historical populations of Pacific salmon have been lost from the Pacific Northwest and California since Euro-American contact.[8]

Human Activities Stressing Fish

Anadromous salmonids inhabit clean, silt-free streams of low water temperature (below 68° F) and quality estuarine nursery habitat. Human activities—logging, grazing, mining, agriculture, urban development, and consumptive water use—can degrade aquatic habitat. Silt can cover streambed gravel, smothering eggs. Poorly constructed roads often increase siltation in streams where adult salmon spawn and young salmon rear. Removal of streamside trees and shade frequently leads to higher water temperatures. Grazing cattle remove streamside vegetation and exacerbate streambank erosion. Urbanization typically brings stream channelization and filled wetlands, altering food supplies and nursery habitat. Habitat alterations can lead to increased salmonid predation by marine mammals, birds, and other fish. Water diversions for agriculture exacerbate these problems. According to state water resource agencies, almost every water basin in Oregon, eastern Washington, and northern California is now over-appropriated (i.e., there are more legal permits for diversion than available water) during the hottest and driest months of the year.

Dams for hydropower, flood control, and irrigation substantially alter aquatic habitat and can have significant impacts on anadromous fish. The 31 dams (i.e., hydroelectric projects) in the Federal Columbia River Power System (FCRPS) produce about 40% of the power in the Pacific Northwest, and the reservoirs behind these dams create a major navigable waterway as far inland as Lewiston, Idaho. While the design of some dams is described as "fish-friendly" (e.g., Wells Dam on the Columbia River in Washington), poorly designed dams can physically bar or impede anadromous fish migrations to and from the sea, kill juveniles as they pass through a dam's turbines, and expose fish to potentially harmful gas supersaturation.[9] If delayed by dams during migration, both juvenile and adult salmon can be exposed to increased predation, to an increased risk of bacterial infections, and to higher temperatures which cause stress and sometimes death.[10] Decreased river flow can also harm juveniles by delaying their downstream migration. Changing FCRPS operations to benefit salmon is controversial, in part because costs of dam and power generation changes are passed along to power customers through increased rates.

The goal of fish hatcheries, operated along the Pacific Coast since 1877, has been the augmentation of natural salmonid populations and the production of fish to replace those lost where dams completely blocked fish passage and destroyed native salmonid populations. Today, at least 80% of the salmon caught commercially in the Pacific Northwest and northern California each year come from hatcheries. In the 1970s, however, scientists discovered that some hatchery practices reduced genetic diversity in fish populations.[11] The mixing of populations by hatcheries and transplantation has generally resulted in decreased genetic fitness of wild populations and the

[8] Richard G. Gustafson et al., "Pacific Salmon Extinctions: Quantifying Lost and Remaining Diversity," *Conservation Biology*, v. 21, no. 4 (2007): 1009-1020.

[9] Water spilled from dams and passing through turbines can become supersaturated with gaseous nitrogen. Juvenile fish exposed to supersaturated conditions can develop disorienting gas bubble disease and become more susceptible to predation.

[10] G. F. Cada et al., "Effects of Water Velocity on the Survival of Downstream-Migrating Juvenile Salmon and Steelhead: A Review with Emphasis on the Columbia River Basin," *Reviews in Fisheries Science*, v. 5, no. 2 (1997): 131-183.

[11] Jack Stern, Jr., "Supplementation of Wild Salmon Stocks: A Cure for the Hatchery Problem or More Problem Hatcheries?" *Coastal Management*, v. 23 (1995), pp. 123, 140.

loss of some stream-specific adaptations. Also, hatchery fish generally have lower survival rates than wild fish, and are less able to adjust to changing ocean conditions or to escape predators.

The harvest of intermingled salmonid populations from different watersheds presents several problems, including how to protect ESA-listed populations while promoting the harvest of abundant native and hatchery fish. Since hatcheries are often more productive than natural fish populations, managing fisheries to avoid surplus returns to hatcheries can result in overharvested natural populations. Controversy arises when managers must consider how much the harvest of abundant populations must be curtailed to protect less abundant ESA-listed populations. Such policies can frustrate both commercial fishermen and sport anglers. ESA-listed or seriously depressed populations thus can become a limiting factor on fish harvest, resulting in tens of millions of dollars in foregone fishing opportunities to avoid further depressing the weakest populations.

Protection and Restoration Efforts

The National Marine Fisheries Service (NMFS, also popularly referred to as "NOAA Fisheries") in the National Oceanic and Atmospheric Administration, Department of Commerce, implements the ESA for anadromous salmonids. NMFS receives a petition from an individual, group, or state agency, or initiates internally the process to determine whether a species or population merits listing as "endangered" or "threatened." Based on facts presented, the Secretary of Commerce decides whether the petition provides substantial information indicating that listing may be warranted. If the Secretary decides affirmatively, a 90-day notice announcing the initiation of a status review is published in the *Federal Register.* Once the status review is completed, NMFS publishes a notice of proposed rulemaking in the *Federal Register* and seeks public comment for those species or populations NMFS believes should be listed. A final listing decision must occur within 12 months after notice publication. Once listed, NMFS is required to designate critical habitat[12] as well as develop and publish a recovery plan for the listed entity.[13] The goal of ESA listing is species recovery, defined as removal from the ESA list.[14]

When a federal activity may harm an ESA-listed salmonid, the ESA requires the federal agency to consult with NMFS to determine whether the activity is likely to jeopardize the survival and recovery of the species or adversely modify its critical habitat. In response to a federal agency's biological assessment, NMFS issues a "biological opinion" (BiOp) with an incidental "take" statement which can authorize a limited take (i.e., harm) of the species and specify reasonable and prudent measures that might minimize harm. If NMFS issues a jeopardy opinion, it includes reasonable and prudent alternative (RPA) actions which could be taken to avoid jeopardizing the species. NMFS may issue numerous BiOps related to salmon each year. For example, a 1995 BiOp for the U.S. Army Corps of Engineers and the Bonneville Power Administration sought to develop a biologically sound strategy to deal with salmon passage in the Columbia and Snake Rivers. The major impact of this BiOp and its 1998 supplement has been the move away from transporting the majority of juvenile salmonids downstream by truck or barge. Instead, the adopted "spread the risk" policy supplements barge transport and reduces fish mortality by increasing the spill of water and fish over dams to circumvent turbines. In 2000, the Corps completed a System Operations Review of the Columbia and Snake River hydropower system,

[12] In practice, critical habitat has been designated for about 44% of all listed species.

[13] For information on current recovery efforts, see http://www.nwfsc.noaa.gov/trt/index.cfm.

[14] For background on the ESA process, see CRS Report RL31654, *The Endangered Species Act: A Primer*, by M. Lynne Corn, Kristina Alexander, and Eugene H. Buck.

with breaching the four lower Snake River dams considered as one among several options. As a result, in December 2000, NMFS issued a revised BiOp that reviewed the strategies outlined in the 1995 and 1998 BiOps and recommended changes. This BiOp did not recommend breaching Snake River dams, but did include steps to consider breaching these dams should the RPA fail. A revised 2004 "no jeopardy" BiOp did not include breaching and was remanded to NOAA by the Federal District Court of Oregon (although not due to dam breaching issues).[15] NOAA released a revised BiOp on May 5, 2008.[16] The final revised BiOp was reviewed by the court as to its adequacy. On September 15, 2009, the Obama Administration, after evaluating the BiOp, filed an Adaptive Management Implementation Plan (AMIP) in an effort to forestall court rejection of the BiOp.[17] The AMIP included:

- immediate acceleration and enhancement of mitigation actions called for under the 2008 BiOp;
- expanded research, monitoring and evaluation to quickly detect unexpected changes in fish populations;
- specific biological "triggers" that, if exceeded, will activate a range of near and long-term responses to address significant fish declines; and,
- preparation by the U.S. Army Corps of Engineers, starting immediately, of a study plan to develop scope, budget, and schedule of studies needed regarding potential breaching of the lower Snake River dams.[18]

In late November 2009, District Court Judge James Redden acknowledged the AMIP as a positive step forward but requested additional information on how the AMIP might be added to the BiOp.[19] NMFS released a modified BiOp, incorporating the AMIP, on May 20, 2010.[20] In August 2011, this 2010 supplemental BiOp was found insufficient by a federal court, and temporary measures put in place in 2005 continue to dictate the Federal Columbia River Power System operation.

Prior to the listing of salmonid ESUs under ESA, the majority of conservation and habitat management efforts were conducted by individual states, tribes, and private industries. In the Columbia River Basin, the Northwest Power and Conservation Council took the lead under the 1980 Pacific Northwest Electric Power Planning and Conservation Act (P.L. 96-501), by attempting to protect salmon and their habitat while also providing inexpensive electric power to the region. Although federal agencies and public utilities have spent hundreds of millions of dollars on technical improvements for dams, habitat enhancement, and water purchases to improve salmon survival, some populations have continued to decline. Recent years have seen an increased interest by state governments and tribal councils in developing comprehensive salmon management efforts. States generally seek to forestall ESA listings, or, if listings do occur, to reduce federal involvement affecting state-managed lands. With limited staff and funding to

[15] See http://seahorse.nmfs.noaa.gov/pls/pcts-pub/sxn7.pcts_upload.summary_list_biop?p_id=14756.

[16] See http://www.nwr.noaa.gov/Salmon-Hydropower/Columbia-Snake-Basin/Final-BOs.cfm.

[17] A copy of the Adaptive Management Implementation Plan and associated documents is available at http://www.salmonrecovery.gov/Biological_Opinions/FCRPS/2008_biop/. For additional background on Columbia River salmon issues and associated litigation, see CRS Report R40169, *Endangered Species Act Issues Regarding Columbia Basin Salmon and Steelhead*, by Kristina Alexander and Eugene H. Buck.

[18] "Obama Administration Gives Court New Adaptive Management Plan to Bolster 2008 Salmon BiOp," *The Columbia Basin Fish & Wildlife News Bulletin*, Sept. 15, 2009, available at http://www.cbbulletin.com/355765.aspx.

[19] See http://www.newsdata.com/fishletter/269/2story.html.

[20] See http://www.nwr.noaa.gov/Salmon-Hydropower/Columbia-Snake-Basin/Final-BOs.cfm.

implement a wide range of programs, NMFS has encouraged integrated management efforts (i.e., habitat conservation plans) among federal, state, and tribal agencies as a tool to save listed species and avoid future listing of additional ESUs through comprehensive recovery efforts. NMFS viewed the Oregon Coastal Salmon Restoration Initiative (OCSRI), to promote comprehensive and proactive state-based recovery efforts and avoid listing coho salmon in Oregon, as precedent for federal/state/local partnerships. However, a federal court decision clarified that, to avoid an eventual listing, plans cannot be based primarily on speculative or proposed future measures, but must instead be based on recovery measures that are enforceable or reasonably likely to occur; for instance, measures embodied in laws, regulations, or long-range and stable funding mechanisms.[21] With the listing of many salmonid ESUs in the Columbia River basin, new options for governance are being explored by federal, state, and tribal parties.

Restoration efforts for some California salmon, including water reforms, were embodied in the Central Valley Project Improvement Act (CVPIA, Title XXXIV of P.L. 102-575) and the San Joaquin River Restoration Program (authorized by Title X, Subtitle A, of P.L. 111-11).[22] Under the CVPIA authority, the U.S. Fish and Wildlife Service (FWS) has coordinated plans for fish screens, fish ladders, and water pollution reduction to recover native fish populations in the Central Valley Project area. On June 4, 2009, a NMFS BiOp concluded that current water pumping operations in the Central Valley Project and the State Water Project jeopardize the survival of winter and spring-run Chinook salmon, Central Valley steelhead, the southern population of North American green sturgeon, and Southern Resident killer whales, which rely on Chinook salmon runs for food.[23] The BiOp provides RPAs, suggesting actions that can be taken to alleviate this jeopardy situation. On May 18, 2010, U.S. District Court Judge Oliver Wanger ruled that federal regulators illegally restricted water pumping from California's San Francisco Bay Delta to protect endangered salmon, striking down salmon protection rules in the BiOp.[24]

Along the border between California and Oregon, a Klamath Basin Restoration Agreement was negotiated by 29 Klamath River stakeholders and signed on February 18, 2010, to address conflicting water management objectives. A second, related Klamath Hydropower Settlement Agreement may result in the removal of four dams on the Klamath River that block salmon and steelhead from historic spawning areas.[25]

NMFS is also reviewing the effects of common pesticides on salmon. In response to a citizen suit filed under the Endangered Species Act against the Environmental Protection Agency (EPA) by a group of environmental organizations (*Washington Toxics Coalition et al. v. EPA*), the U.S. District Court for the Western District of Washington issued an order that establishes pesticide buffer zones.[26] Buffer zones are areas adjacent to certain streams, rivers, lakes, estuaries, and other water bodies, where the court ordered that certain pesticides not be used. Generally, these buffers are 20 yards wide for ground application and 100 yards for aerial application, adjacent to certain "salmon-supporting waters" in Washington, Oregon, and California. NMFS is in the process of reviewing different pesticides and issuing BiOps on their use and application.[27]

---

[21] Oregon Natural Resources Council v. Daley, CV-97-1155-ST (D.Or. June 1, 1998).

[22] For background information, see http://www.usbr.gov/mp/SJRRP/index.html and CRS Report RL34237, *San Joaquin River Restoration Settlement*, coordinated by Betsy A. Cody and Pervaze A. Sheikh.

[23] See http://swr.nmfs.noaa.gov/ocap.htm.

[24] For a copy of this opinion, see http://www.acwa.com/sites/default/files/news/endangered-invasive-species/2010/05/salmon-findings-fact-wanger.pdf.

[25] Copies of the two agreements can be found at http://www.edsheets.com/Klamathdocs.html.

[26] See http://www.epa.gov/espp/litstatus/wtc/maps.htm#wtc6.

[27] For examples, see http://www.nmfs.noaa.gov/pr/pdfs/carbamate.pdf and http://www.nmfs.noaa.gov/pr/pdfs/

However, restrictions on pesticide application are controversial as some agricultural interests believe this action poses an economic threat to their operations.[28]

In 1993, NMFS issued an interim policy on artificial propagation of Pacific salmon under the ESA to guide how hatcheries should be used to help recover salmonids.[29] In response to litigation over the role of hatcheries in salmon recovery, a policy statement defined how hatchery fish are to be treated when deciding whether ESUs should be listed under the ESA.[30] In general, the policy is to recover wild populations in their natural habitat wherever possible, without resorting to artificial propagation. Washington, Oregon, and British Columbia mass-mark hatchery coho salmon by fin clipping so that marked fish can be readily identified by fishermen as hatchery fish and selectively harvested, while unmarked, native fish can be released to spawn. Similar programs are underway for other species, such as Chinook salmon and steelhead trout.

An FWS review of Columbia River hatcheries for their contribution to salmon recovery, begun in May 2005, was completed in June 2010.[31] An independent scientific panel's collaborative review of 178 hatchery programs in the Columbia River Basin, begun in 2006 to identify (1) hatchery programs that are not contributing to salmon recovery and (2) ways to reduce the harvest of ESA-listed fish, was completed in February 2009 with the publication of both a comprehensive system-wide report and a shorter report for Congress.[32] Summary conclusions focus on:

- managing hatchery broodstocks to achieve proper genetic integration with, or segregation from, natural populations;
- promoting local adaptation of natural and hatchery populations;
- minimizing adverse ecological interactions between hatchery- and natural-origin fish;
- minimizing effects of hatchery facilities on the ecosystem; and
- maximizing survival of hatchery fish.

In January 2009, the nonprofit Resource Renewal Institute funded a report by a "Council of Elders"—experienced older professionals—to offer recommendations on Columbia River salmon recovery for the Obama Administration.[33] This group provided eight priority recommendations:

- Establish White House leadership and coordination of all salmon recovery actions by federal agencies.
- Consolidate of ESA responsibilities for all salmon species within FWS.
- Transfer implementation of salmon recovery and mitigation programs from the Bonneville Power Administration (BPA) to FWS, with continued funding by BPA.

pesticide_biop.pdf.

[28] For example, see http://www.icis.com/Articles/2004/02/06/555665/pesticide-buffer-zones-near-salmon-streams-are-unnecessary-says-industry.html.

[29] 58 *Federal Register* 17573 (April 5, 1993).

[30] 70 *Federal Register* 37204 (June 28, 2005).

[31] For background, see http://www.fws.gov/pacific/Fisheries/Hatcheryreview/index.html; A summary of the hatchery review is available at http://www.fws.gov/pacific/Fisheries/Hatcheryreview/Reports/final%20docs/Federal%20Hatchery%20Review%20Summary%20Document_29Oct2010.pdf.

[32] Both reports are available at http://www.hatcheryreform.us/mfs/reports/columbia/welcome_show.action.

[33] *Recommendations to the Obama Administration for an Improved Columbia River Salmon Recovery Program*, available at http://www.rri.org/pdf/cosalmon128.pdf.

- Initiate audit and oversight of the Northwest Power and Conservation Council and Bonneville Power Administration to ensure compliance.
- Direct federal agencies to include impacts of climate change and population growth in biological opinions and salmon recovery plans.
- Issue an Executive Order directing all federal agencies to foster and protect independent science and scientists implementing federal programs.
- Support a congressional request for a comprehensive study of the benefits and costs of removing the four Lower Snake River Dams.
- Direct the White House Council on Environmental Quality to develop and implement a federal water management-salmon recovery plan for the Columbia River Basin.

Legislative activities in the 112th Congress to address these and other concerns related to Pacific salmonids can be found in CRS Report R41613, *Fishery, Aquaculture, and Marine Mammal Issues in the 112th Congress*, by Eugene H. Buck and Harold F. Upton.

Table 1. Status of Five Species of Pacific Coast Salmonids

Species	Population (ESU)	Status	Federal Register (FR) Citation	Pending Actions
Coho salmon (*Oncorhynchus kisutch*)	1. Central California Coast	Endangered	70 FR 37160 (June 28, 2005)	
	2. Southern Oregon/Northern California	Threatened	70 FR 37160 (June 28, 2005)	
	3. Lower Columbia River	Threatened	70 FR 37160 (June 28, 2005)	Critical habitat under review by NMFS
	4. Oregon Coast	Threatened	73 FR 7816 (Feb. 11, 2008)	
	5. Puget Sound/Strait of Georgia	Species of Concern	69 FR 19975 (Apr. 15, 2004)	
	6. Southwest Washington	Undetermined		
Chinook salmon (Oncorhynchus tshawytscha)	1. Sacramento River winter-run	Endangered	70 FR 37160 (June 28, 2005)	
	2. Upper Columbia River spring-run	Endangered	70 FR 37160 (June 28, 2005)	
	3. Snake River fall-run	Threatened	70 FR 37160 (June 28, 2005)	
	4. Snake River spring/summer-run	Threatened	70 FR 37160 (June 28, 2005)	
	5. Central Valley spring-run	Threatened	70 FR 37160 (June 28, 2005)	
	6. California coastal	Threatened	70 FR 37160 (June 28, 2005)	
	7. Puget Sound	Threatened	70 FR 37160 (June 28, 2005)	
	8. Lower Columbia River	Threatened	70 FR 37160 (June 28, 2005)	
	9. Upper Willamette River	Threatened	70 FR 37160 (June 28, 2005)	
	10. Central Valley fall and late fall-run	Species of Concern	69 FR 19975 (Apr. 15, 2004)	
Chum salmon (*Oncorhynchus keta*)	1. Hood Canal summer-run	Threatened	70 FR 37160 (June 28, 2005)	
	2. Columbia River	Threatened	70 FR 37160 (June 28, 2005)	
Sockeye salmon (*Oncorhynchus nerka*)	1. Snake River	Endangered	70 FR 37160 (June 28, 2005)	
	2. Ozette Lake	Threatened	70 FR 37160 (June 28, 2005)	
Steelhead trout (*Oncorhynchus mykiss*)	1. Southern California	Endangered	71 FR 834 (Jan. 5, 2006)	
	2. Upper Columbia River	Threatened	74 FR 42605 (Aug. 24, 2009)	
	3. Central California Coast	Threatened	71 FR 834 (Jan. 5, 2006)	

Species	Population (ESU)	Status	Federal Register (FR) Citation	Pending Actions
	4. South Central California Coast	Threatened	71 FR 834 (Jan. 5, 2006)	
	5. Snake River Basin	Threatened	71 FR 834 (Jan. 5, 2006)	
	6. Lower Columbia River	Threatened	71 FR 834 (Jan. 5, 2006)	
	7. California Central Valley	Threatened	71 FR 834 (Jan. 5, 2006)	
	8. Upper Willamette River	Threatened	71 FR 834 (Jan. 5, 2006)	
	9. Middle Columbia River	Threatened	71 FR 834 (Jan. 5, 2006)	
	10. Northern California	Threatened	71 FR 834 (Jan. 5, 2006)	
	11. Puget Sound	Threatened	72 FR 26722 (May 11, 2007)	Critical habitat under review by NMFS
	12. Oregon Coast	Species of Concern	69 FR 19975 (Apr. 15, 2004)	

Source: U.S. Dept. of Commerce, NMFS, "Snapshot of ESU Status" (http://www.nwr.noaa.gov/ESA-Salmon-Listings/upload/1-pgr-8-11.pdf).

Author Information

Harold F. Upton
Analyst in Natural Resources Policy

Acknowledgments

Retired CRS specialist Eugene H. Buck made important contributions to this report.

Disclaimer